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Phosphorus Management in Cranberry Systems

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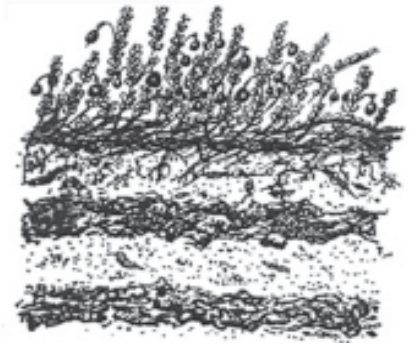

BEST MANAGEMENT PRACTICES

Phosphorus Management in Cranberry Systems

Research in WI has shown that cranberries require additions of phosphorus fertilizer for sustained productivity. However, trying to determine the right amount of phosphorus to add and when to add it is very difficult - one of the few aspects of crop management where cranberries have something in common with other crops. What makes the situation extra hard in cranberries is that programs of soil and tissue testing often give conflicting information - it is not uncommon to see soil test values of phosphorus in or above the normal range (20-80 ppm Bray P) and tissue phosphorus contents either at the low end of the normal range (0.10%) or below this value.

Phosphorus availability in the soil is related to many things. In an established cranberry planting the moisture status of the soil (from the saturated conditions after winter flood water is drawn to the drier conditions of the summer) plays a role in phosphorus availability. Type of soil, whether a mineral, sandy soil, a classic sanded peat, or a straight peat planting also plays a role. Finally, the amount of iron in the soil is also important in how available phosphorus is in cranberry plantings.

Recommended Practices

- ***Soil testing*. Collect soil in the late summer for testing using the Bray-P method. If soil iron is >200 ppm, disregard the soil P result, otherwise soil P should fall between 20 and 80 ppm.**

  Studies comparing three different soil test methods on 24 different cranberry soils showed very poor results in predicting available soil phosphorus. Closer examination of two standard methods (Bray and Mehlich 3) showed some correlations with phosphorus availability, however when soil iron levels were over 200 ppm the prediction ability of the soil test was poor.

  Close examination of soil test methods for phosphorus showed that as soils dry, the soil test values are highly variable. The most consistent values were found when soil phosphorus tests were conducted on soils which were at the moisture ranges normal during the summer growing season. Since soils have definitely reached this point by the time recommended for tissue sampling (August 15 - September 15), it is a good idea to take your soil and tissue samples together. This supersedes previous recommendations in the Cranberry Chart Book.

- ***Soil moisture status*. Plan phosphorus fertilizer applications based on soil type and moisture. On sandy soils, phosphorus fertilizer may be applied early in the season. Otherwise, apply no phosphorus fertilizer until soils have dried (after frost season ends).**

  The impact of soil moisture status on phosphorus availability is different between sandy mineral soils and other cranberry soil types. the sandy soils do not show a reduction of phosphorus availability as the soils dry after winter flood removal. Thus, phosphorus fertilizers may be added to these types of soils regardless of moisture status.

  Classic cranberry bog soils have different soil phosphorus retention and release patterns depending upon how saturated the soil is. As the soil goes from the fully saturated conditions after the winter flood, through the wet conditions of spring and the frost protection season, to finally the relatively dry conditions of summer, the soil's retention of phosphorus increases and it's ability to release this phosphorus decreases. Due to this, applying phosphorus to cranberries on traditional soils prior to roughneck stage is not a recommended practice. In the early season, the soil is already releasing phosphorus.

CONVERSIONS

Fertilizer	lbs P_2O_5 per 100 lbs	lbs P per 100 lbs
0-22-0	22	9.5
12-24-12	24	10.3
0-46-0	46	19.8
0-33-0	33	14.2

- ***Phosphorus fertilizer rates and timing*. On traditional cranberry soils, apply 20 lbs P/A yearly over 2-3 applications beginning in late spring. On sandy soils, use a higher rate over more applications. These may begin earlier.**

  Phosphorus fertilizer is needed for sustained production in cranberry systems. However, long term field trials looking at rates of phosphorus fertilizer from 0 to 60 lbs P/A have shown that fertilizer rates from 20-60 lbs P/A yearly produce equally high yield and fruit quality. Research has indicated that soils with high soil test phosphorus may actually have yield reductions when high amounts of phosphorus fertilizer are used. In the same field trial, several timings for split phosphorus application were tested - all were equally good. In soil chemistry studies, it was shown that sandy soils hold and release phosphorus poorly. Traditional, layered soils released some phosphorus in the spring (when soil moisture was high) but released much less when the soil had dried to summer conditions.

  Use less phosphorus (20 lbs P/A yearly) on traditional beds which are well established and consistent producers. Begin applications (2-3 for the season) after soil has dried - late spring. Slightly higher rates (40 lbs P/A yearly) may be needed on sandy mineral plantings in order to make a number of applications. On this soil type, applications should be small and frequent. Final applications for the season on all soils should be at the time of bud development.

- ***Forms of phosphorus fertilizers*. Standard soluble phosphorus (such as triple superphosphate), rock phosphate, bone meal, and Osmocote™ are all good sources of phosphorus fertilizer. Foliar phosphoric acid should be avoided during bloom and on all fresh fruit plantings.**

  Crop yield is highest and field rot is lowest with standard soluble phosphorus fertilizer sources. The most common of these is triple superphosphate although blended fertilizers may also include mono-ammonium phosphate or di-ammonium phosphate. If you put phosphorus fertilizers on separately from nitrogen and potassium, research has shown that rock phosphate fertilizer is as good a fertilizer as triple super phosphate and may be less expensive. If you are interested in a slow release fertilizer or an organic fertilizer, Osmocote™ and bone meal have been shown to give results that are consistent with triple superphosphate. Other forms of organic phosphorus fertilizers may have yield limitations and are not suggested for use. Other slow release materials were not tested.

  Foliar phosphorus fertilizers are available but may have some negative impact on crop quality. Foliar phosphoric acid has been shown to lead to an increase in filed rot and should only be used pre-bloom in situations where there is a severe phosphorus shortage in the plants. Foliar phosphoric acid should **not** be used on fresh fruit beds or during bloom.

For further information:

Cranberry chart book - management guide for Massachusetts. University of Massachusetts Cranberry Experiment Station.

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